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As a purely anatomical work it is excellent. It will be much more useful to veterinarians than to any other class of readers and it was largely written for them. However, no one in any way interested in the anatomy of the dog can afford to be without it; and it is gratifying to have the labor performed for the first time so faithfully and so well. An English translation should be made.—MORITZ FISCHER.

General Notes.

GEOLOGY AND PALEONTOLOGY.

The Crystalline Cambrian Deposits in Massachusetts.

The Essex Bull., vol. xxiii, 1891, publishes another paper by Mr. J. H. Sears, on the Olenellus Cambrian rocks of Essex County, Mass. The numerous out-crops of these rocks, their position and condition lead the author to the following theory:

That during the Cambrian period a vast sheet of these sediments was deposited over the entire region to the depth of some hundreds of feet. They have been distorted and crumpled into anticlinal and synclinal folds by the intrusion of eruptive rocks. The distortion left their entire surface a series of cracks and faults, which made them a prey to the forces of erosion and decay. The ice sheet during the glacial period scoured these sedimentary beds and ground the rocks to boulders and fine till, which is now scattered over Cape Ann and in the neighboring waters of the Atlantic Ocean. This would account for the absence of glacial grooves on the surface of granite areas, for the ice sheet probably never touched the greater portion of the granite area. Aerial decay has since destroyed all that was left of the sedimentary beds after the ice period, except such remnants as are found to-day. The absence of fossils in many of the beds is due to contact metamorphism.

The Fauna of the Armorican Sandstones.—M. Charles Barrois has recently published (*Ann. Soc. Geol. du Nord. Avril, 1891*) a memoir in which he describes the fauna, and discusses the systematic position of the Armorican sandstones of Bretagne. The fauna consists of 151 sponges, 155 Brachiopods, 157 Lamellibranchs, 212 Gastropods, 218 Pteropods, and 219 Crustaceans. In giving the biological characters of the fauna, the writer calls attention to the very slight ornamentation of the shells of the Lamellibranchs. They are characterized by equal valves and by the length of the cardinal line. A

careful comparison with equivalent faunas of other regions shows that the fauna of the Armorician sandstones is intermediate between the primordial and that of Llandeilo. The advanced types of the *Lamellibranchs* induces M. Barrois to correlate these sandstones with the lower beds of Llandeilo rather than with those of Trimadoc.

Relations of the Chemung-Catskill Group to the Lower Carboniferous.—In an address before the section of Geology and Geography at the Washington meeting of the A. A. A. S., Prof. John Stevenson suggested that the Catskill as well as some portion of the Chemung may be contemporaneous with the lower beds of the lower Carboniferous of Ohio, and instances the following facts as having a bearing upon the question :

“*First*, That the Chemung and Catskill deposits were laid down in a shallow basin subsiding most rapidly at the East and along a line rudely parallel to the Blue Ridge trench.

“*Second*, That the deposits would be much greater near the mainland at the East than at two hundred miles away ; so that six hundred feet more or less of fine material in Ohio would more than fairly represent the four thousand feet of Chemung in Eastern Pennsylvania.

“*Third*, That the water beyond the reach of the great land wash held a Chemung fauna throughout the whole line of the Catskill deposit.” (Proceeds. A. A. A. S., vol. xl, 1891.)

Water-Bearing Horizons of Southern New Jersey.—Mr. Lewis Woolman reports the discovery of a third water-bearing horizon at Atlantic City, N. J. It is probable that these three horizons continue under the beaches South of Barnegat Inlet and beneath the Southern interior to a distance of 25 or 30 miles or more from the coast. The two upper ones have an intimate connection with a diatomaceous clay-bed, having a thickness of 300 feet. In view of the thickness and extent of the diatomaceous clay-bed in New Jersey, Mr. Woolman thinks its prolongation into the Southern Atlantic States should be expected, and that there is a strong probability that the outcrops on Chesapeake Bay near Annapolis, at Nomini Cliffs, and at Richmond, Va., are either identical with the New Jersey stratum or closely related to it and belonging to the same series (Annual Rept. N. J. Geol. Surv., 1890).

Prizes of the London Geological Society for 1891.—The medals and funds to be given at the anniversary meeting of the Geological Society on February 19, have been awarded as follows:—The Wollaston medal to Baron Ferdinand von Richthofen; the Murchison medal to Professor A. H. Green, F. R. S.; and the Lyell medal to Mr. George H. Moreton. The balance of the proceeds of the Wollaston Fund to Mr. O. A. Derby; that of the Murchison Fund to Mr. Beeby Thompson; that of the Lyell Fund to Mr. E. A. Walford and Mr. J. W. Gregory, and a portion of the Barlow-Jameson Fund to Prof. C. Mayer-Eymar. (*Geol. Mag.* Feb., 1892.)

Interval Between the Glacial Epochs.—In the *Bull. Geol. Soc. Am.*, April, 1890, Mr. T. C. Chamberlin presents additional evidences bearing upon the interval between the Glacial Epochs; viz, that the early glacial plains are trenched by interglacial valleys. An examination of the lower Mississippi shows that the erosion amounts in round numbers to a trench about 300 feet in depth and about sixty miles in width. This erosion represents the interval between the formation of the silts of the earlier glacial epochs and the filling in of the valley deposits of the later glacial epochs. The upper Ohio and Allegheny, the Susquehanna, and the Delaware rivers have done a corresponding amount of work. The cutting of these trenches rudely measures the length of the interval between the glacial epochs, or at least the length of the actively erosive part of it.

Arkansas Geological Survey, 1890.—A report on Manganese, its Uses, Ores and Deposits,¹ by Dr. R. A. F. Penrose, Jr. has recently been published by the Arkansas Geological Survey. In order to ascertain the importance of the Arkansas deposits Dr. Penrose visited and personally examined every known manganese region in North America—those of Arkansas, Georgia, Tennessee, Virginia, Vermont, Texas, Arizona, Colorado, California, Oregon, Nevada, Utah, Nova Scotia and New Brunswick. The conclusions given in the report are therefore based upon direct personal observations, and are thoroughly trustworthy.

The author discusses (1) The uses of manganese, together with the history and statistics of the manganese industry; (2) The ores of manganese; (3) The nature of the manganese deposits. The chapter on the origin and chemical relations of manganese deposits is of special

¹ Annual Report Arkansas Geological Survey, 1890, vol. I. Manganese; Its Uses, Ores, and Deposits. By R. A. F. Penrose, Jr., Ph. D.

interest to the general reader. The sources of the metal, the forms and conditions of deposition and precipitation, and the geologic distribution, are given in a clear, concise and orderly way that shows a mastery of the subject.

The richest deposits in the United States are confined almost entirely to the Cambrian and Silurian rocks, while in Canada they are found in the Lower Carboniferous.

Dr. Penrose accounts for the variability in the quantity of ore, in different horizons, and in different places in the same horizon, by the conditions surrounding the deposition.

A geological map of the Batesville, Arkansas, region is folded in the pocket of the volume, and the text is still further illustrated by a number of figures and plates.

Geological Survey of Texas, 1890.²—The Second Annual Report of the State Geologist of Texas is a quarto of 756 pages, replete with information, valuable not only to the citizens of the state, but also to the geologists at large. The report of the State and Field Geologists are followed by an admirable series of papers which take up in detail a study of each formation with its various economic minerals and possibilities. Messrs. Dumble, Birkinbine, Lerche, Kennedy, Herndon and Walker report on the Iron Ore District of East Texas; Mr. Cummings gives the geology of the north-western part of the State; Mr. Comstock the geology and mineral resources of the central mineral region; and, finally, Mr. Streerowitz describes the geology and mineral resources of Trans-Pecos, Texas.

A separate chapter is given to a description, by Alpheus Hyatt, of the Carboniferous Cephalopods. These forms being extremely limited in their chronological distribution are helpful in distinguishing the age of the rocks in which they are found, and it was therefore decided to have them all published in one treatise.

The report is abundantly illustrated with plates, sections and maps, which add materially to its value and interest.

Geological News-General.—It is the opinion of Mr. Waldemar Lindgren that there exists in southern Lower California two orographic lines of great importance. (1) A comparatively recent, probably Post-cretacic line of dislocation extending from the vicinity of La Paz northward for many hundred miles along the eastern coast. (2) A

² Second Annual Report of the Geological Survey of Texas, 1890. E. T. Dumble, State Geologist.

line along which an uplift of much greater age than the first one has taken place, runs near the western shore of the peninsula. This line is indicated by several short ranges mostly composed of crystalline schists and granite. It is probable that the mesa sandstones have been derived from this older area by erosion. (Proceeds. Cal. Acad. Sci. vol. III. Pt. 1.)—Dr. Lydekker has recently published a summary of the present state of knowledge of the Fossil Birds found in Great Britain. He has embodied in this summary brief descriptions of typical specimens, pointing out some of the more striking features by which particular bones of certain groups may be recognized. The total number of species recorded in various collections is slightly over 60. This includes, however, birds of the superficial deposits, many of which belong to existing species; the list of extinct forms admitted as valid, falls short of 20.

Paleozoic.—Contributions to the Micro-Palæontology, Part III, has recently been published by the Geological Survey of Canada. It consists of a report on Ostracoda from the Cambro-Silurian, Silurian, and Devonian rocks at various localities in the Dominion by Prof. Rupert T. Jones, with a critical note on the species described by him in 1858. It contains forty-one pages of letter press, illustrated by four full page lithographic plates and five wood cuts.—W. B. Dwight has recently found a fossiliferous stratum of the Paradoxides zone at Stissing, New York. The species collected consists of *Leperditia ebena*, *Kutorgina stissingensis*, *Olenoides stissingensis*, all undescribed, and a Hyolithes, probably "Billingsii."—Four new Silurian fossils have been described by Mr. Whiteaves; *Srophomena acanthoptera*, *Pentamerus decussatus*, *Gomphoceras parvulum*, and *Acidaspis perarmata*. The fossils are the characteristic ones of an area of Silurian rocks discovered by Mr. J. B. Tyrrell on the Northeast side of Lake Winnipegosis, on Cedar Lake, and on the Saskatchewan River below Cedar Lake. (Can. Rec. Sci., April, 1891.)

Cenozoic.—The frontlet and horn-cores of an antelope discovered by Dr. Leeson in the Plistocene deposits near Twickenham have been identified by A. Smith Woodward as those of *Saiga tatarica*. The remains of Saiga have been found in France and Belgium, but until now there has been no evidence of the occurrence of this animal in the British area. (Proceeds. Lond. Zool. Soc., Nov. 4, 1890.)—The Geol. Survey of the United Kingdom has recently published a memoir by E. T. Newton embracing an account of all the Vertebrata

from the Pliocene deposits of Britain. The total number catalogued and discussed by the author is 212, of which 20 have evidently been derived from eocene rocks. After the elimination of derived and doubtful forms, about 142 definite species remain which have been tabulated as follows :

	Number of Species.	Occur also in Lower Beds.	Lived on to a Later Period.	Living Species.	Extinct Species.	Percentage of Living Forms.
Nodule bed below						
The Red Crag.....	68	—	20	6	62	8.8
Coralline Crag.....	15	8	8	5	10	—
Red Crag.....	6	5	5	3	3	—
Norwich Crag.....	21	10	12	5	16	—
Weybourn Crag...	7	5	6	5	2	—
Forest-bed.....	65	17	47	45	20	69.2

Mesozoic.—Mr. A. Smith Woodward has recognized three reptilian bones in a collection of vertebrate fossils from the Cretaceous formation of Bahia, Brazil. Two of the bones represent the articular end of a large Pterosaurian quadrate, while the third is a Plesiosaurian. The pterodactyle is the first of the kind in the Southern hemisphere, and the discovery of the Plesiosaurs adds another important locality to the known distribution of that order. (*Ann. & Mag. Nat. Hist.*, Oct., 1891.)—According to R. S. Tarr, the Permian of Texas in its most typical development was a completely enclosed sea. This is proved by the nature of its beds. In no other way can the numerous layers of gypsum and salt be accounted for. It would also explain the redness of the clays and sandstone beds. The peculiar sickly gray color of the limestone is that of an inland sea deposit, and the abundance of vertebrate fossils of both land and inland sea types is thus accounted for. The small break between the Carboniferous and the Permian shows that in point of time the formations were immediately associated, the marked difference in the nature of the beds, and the character of the fauna being due rather to changed conditions than to actual lapse of time. (*Am. Journ. Science*, Jan., 1892.)